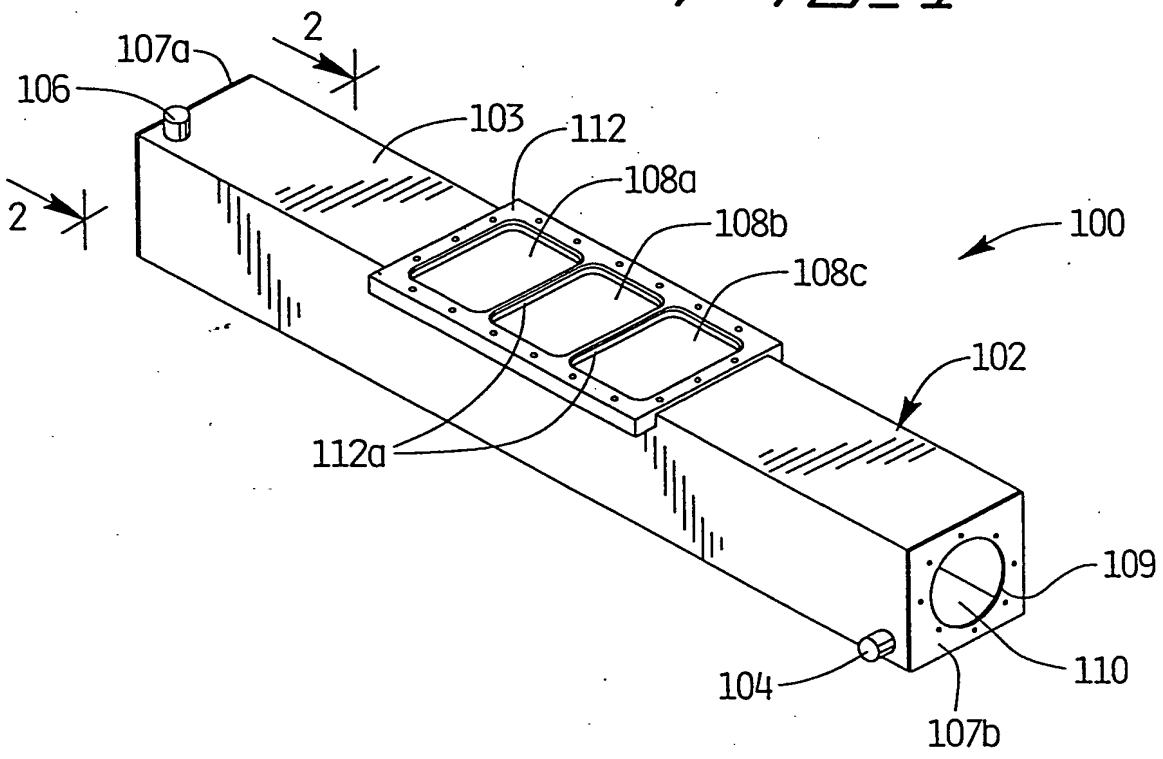
FIG_1


2
107a
106
103
112
108a
108b
100
2
108c
102
112a
109
110
104
107b

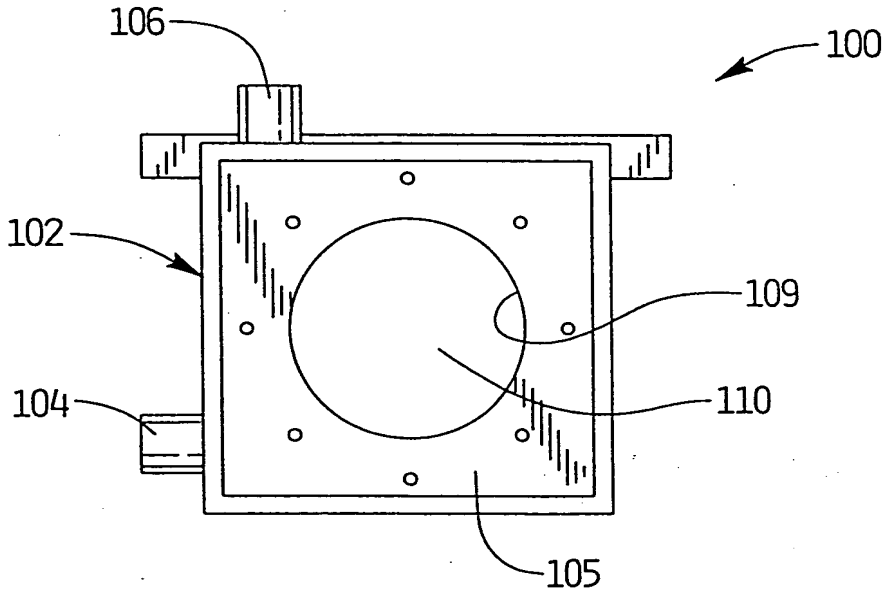

106
100
102
109
104
110
105

FIG_2

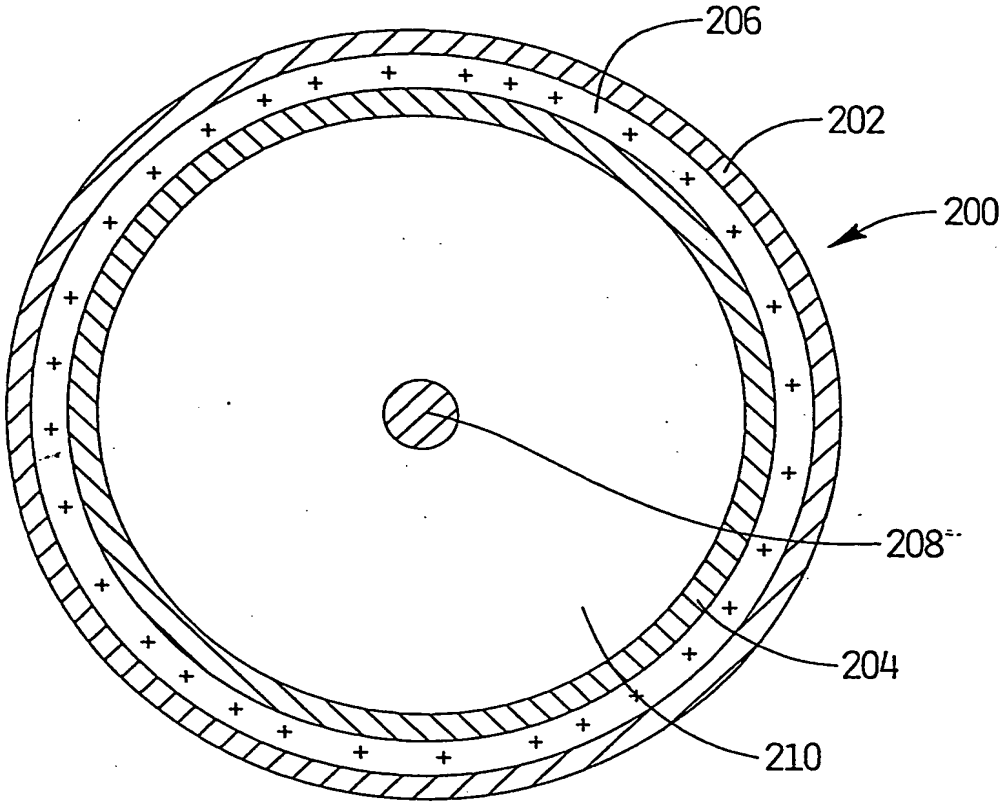

206
202
200
208
204
210

FIG_3

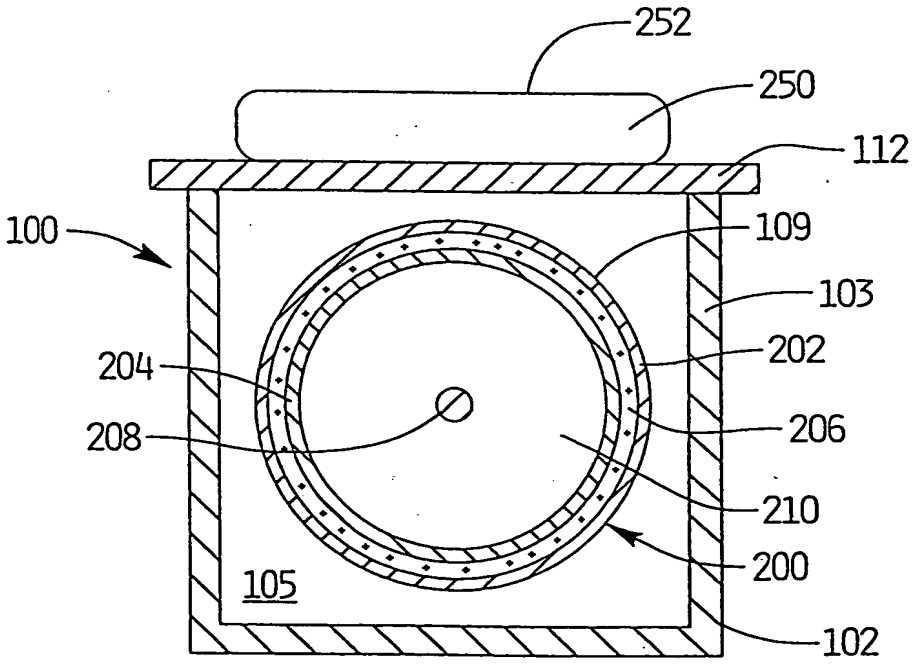

252
250
112
100
109
103
204
202
208
206
210
200
105
102

FIG_4

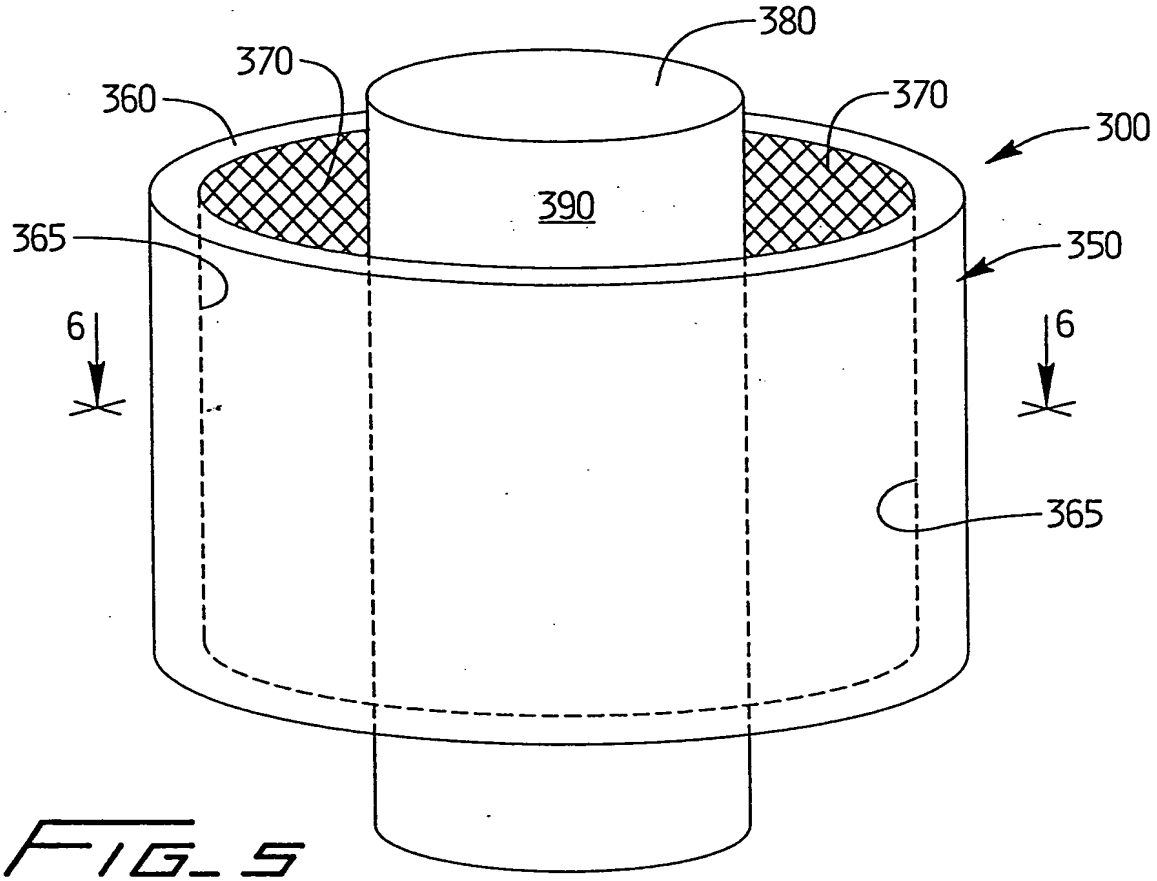

380
370
360
370
300
390
365
350
6
6
365

FIG_5

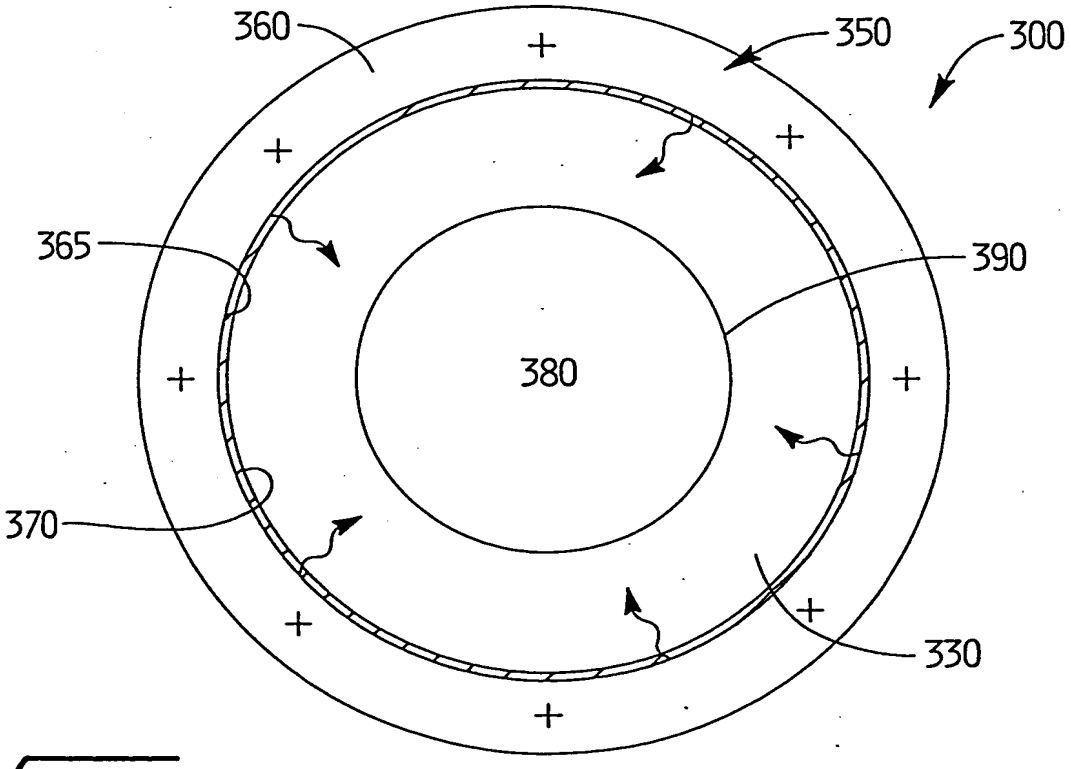

360
350
300
365
390
380
370
330

FIG_6

FIG. 7

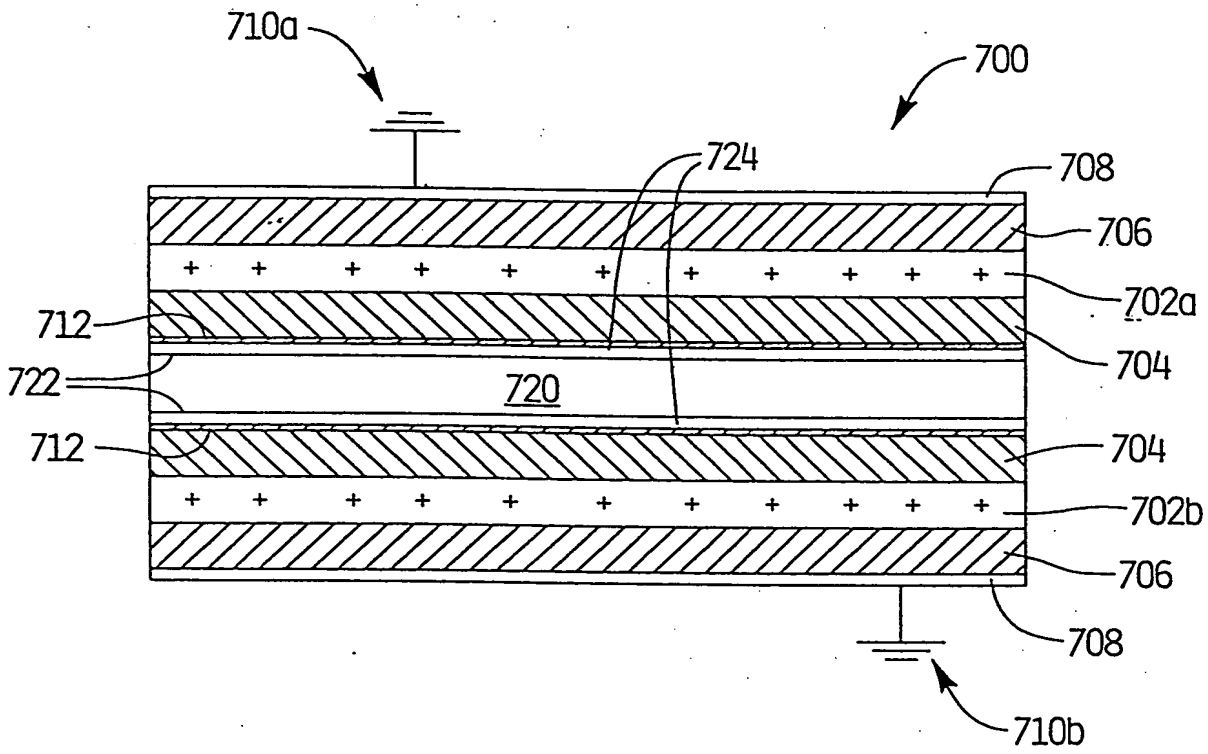
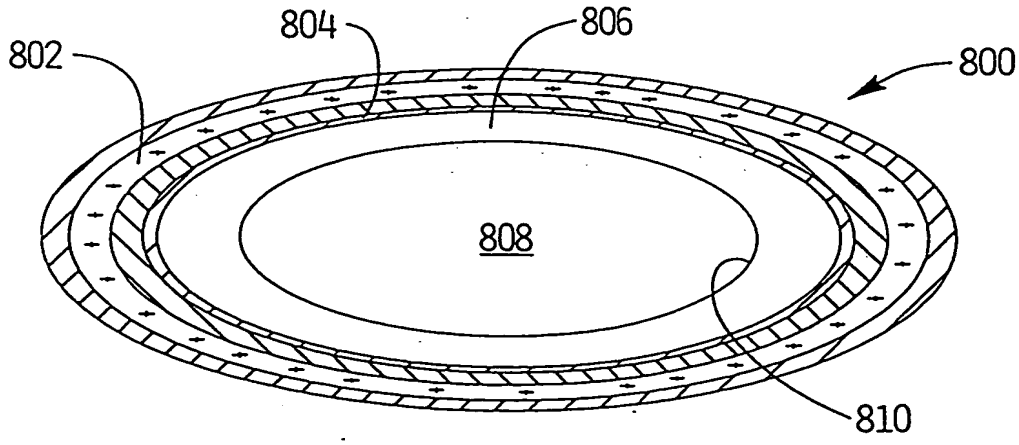

710a
700
724
708
706
702a
712
704
722
720
712
704
702b
706
708
710b

FIG. 8


804
806
802
800
808
810

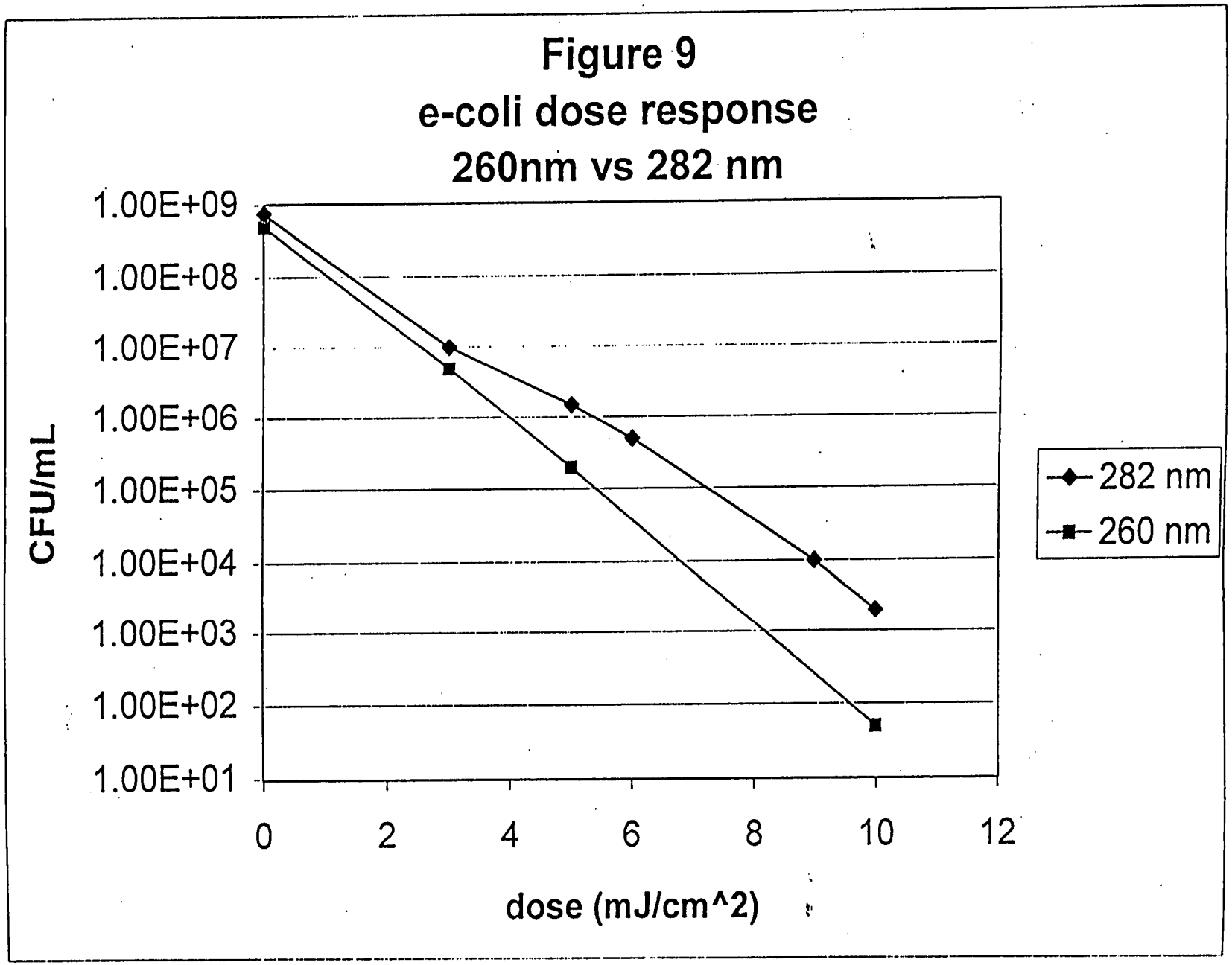
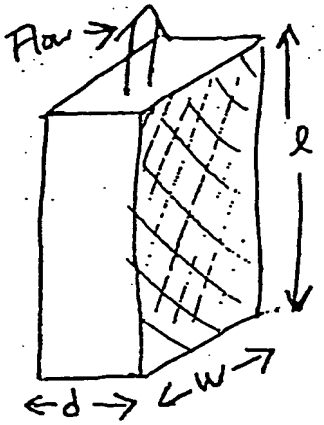


Figure 9
e-coli dose response
260nm vs 282 nm
1.00E+09
1.00E+08
1.00E+07
1.00E+06
1.00E+05
1.00E+04
1.00E+03
1.00E+02
1.00E+01
CFU/mL
0
2
4
6
8
10
12
dose (mJ/cm^2)
282 nm
260 nm

FIG. 10a

Define cell size




depth := 1·mm

length := 15·cm

width := 3·cm

CrossArea := 2·length·width  CrossArea = 90 cm²

Vol := length·width·depth  Vol = 4.5 cm³

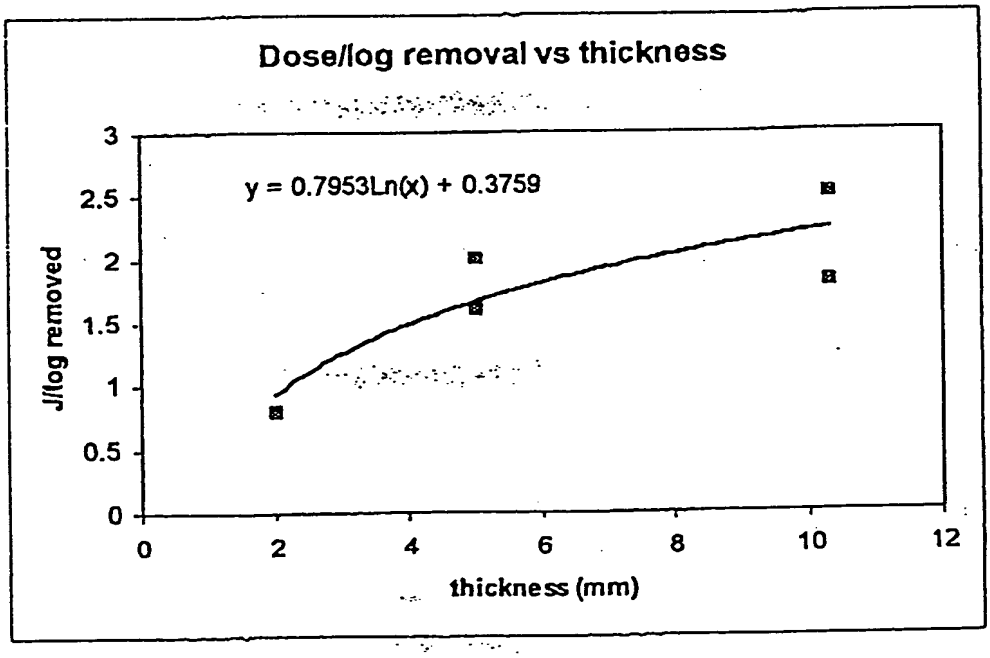
Set flow rate  $TARGET := 50 \cdot \frac{cm^3}{1 \cdot min}$  $Duration := \frac{65 \cdot cm^3}{TARGET}$

Duration = 78 s  Duration is time required to treat a unit of platelets

Calculate residence time  $TIME := \frac{Vol}{TARGET}$  TIME = 5.4 s

Set "surface" dose  $SDose := \frac{depth}{(2mm)} \cdot \frac{J}{cm^2}$  Linear fit for small gaps

$SDose = 0.5 \frac{J}{cm^2}$  The "Surface Dose" is based on measurements of parvo reduction as a function of platelet (and plasma) thickness.



Set lamp intensity

$$POWERden := \frac{SDose}{TIME \cdot 2} \qquad POWERden = 0.046 \frac{W}{cm^2}$$

Compare this intensity with other lamps

$$Hemalight := 0.020 \cdot \frac{W}{cm^2} \qquad \frac{POWERden}{Hemalight} = 2.315$$

$$Fluor := 0.008 \cdot \frac{W}{cm^2} \qquad \frac{POWERden}{Fluor} = 5.787$$

Calculate electrical parameters

Assume 15% efficeincy

$$ElectricalDensity := \frac{POWERden}{0.15} \qquad ElectricalDensity = 0.309 \frac{W}{cm^2}$$

Calculate lamp power

$$TotPOWER := POWERden \cdot CrossArea \cdot 2$$

$$TotELEC := ElectricalDensity \cdot CrossArea \cdot 2$$

$$TotPOWER = 8.333\ W$$

$$TotELEC = 55.556\ W$$

FIG. 10b

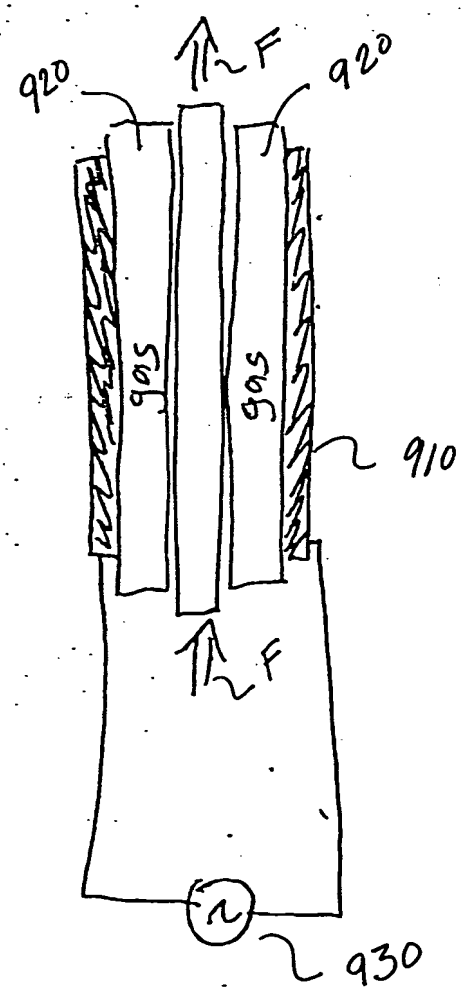



FIG. 11a

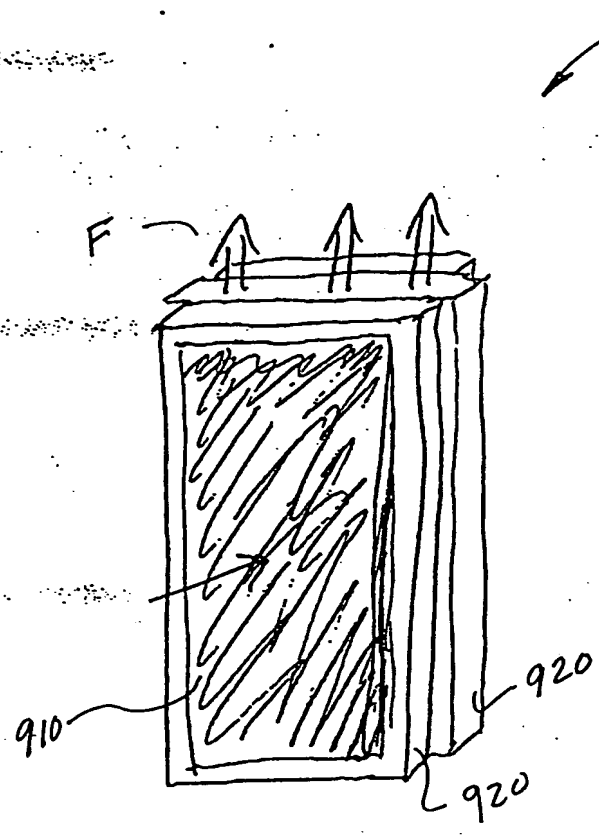



FIG. 11b

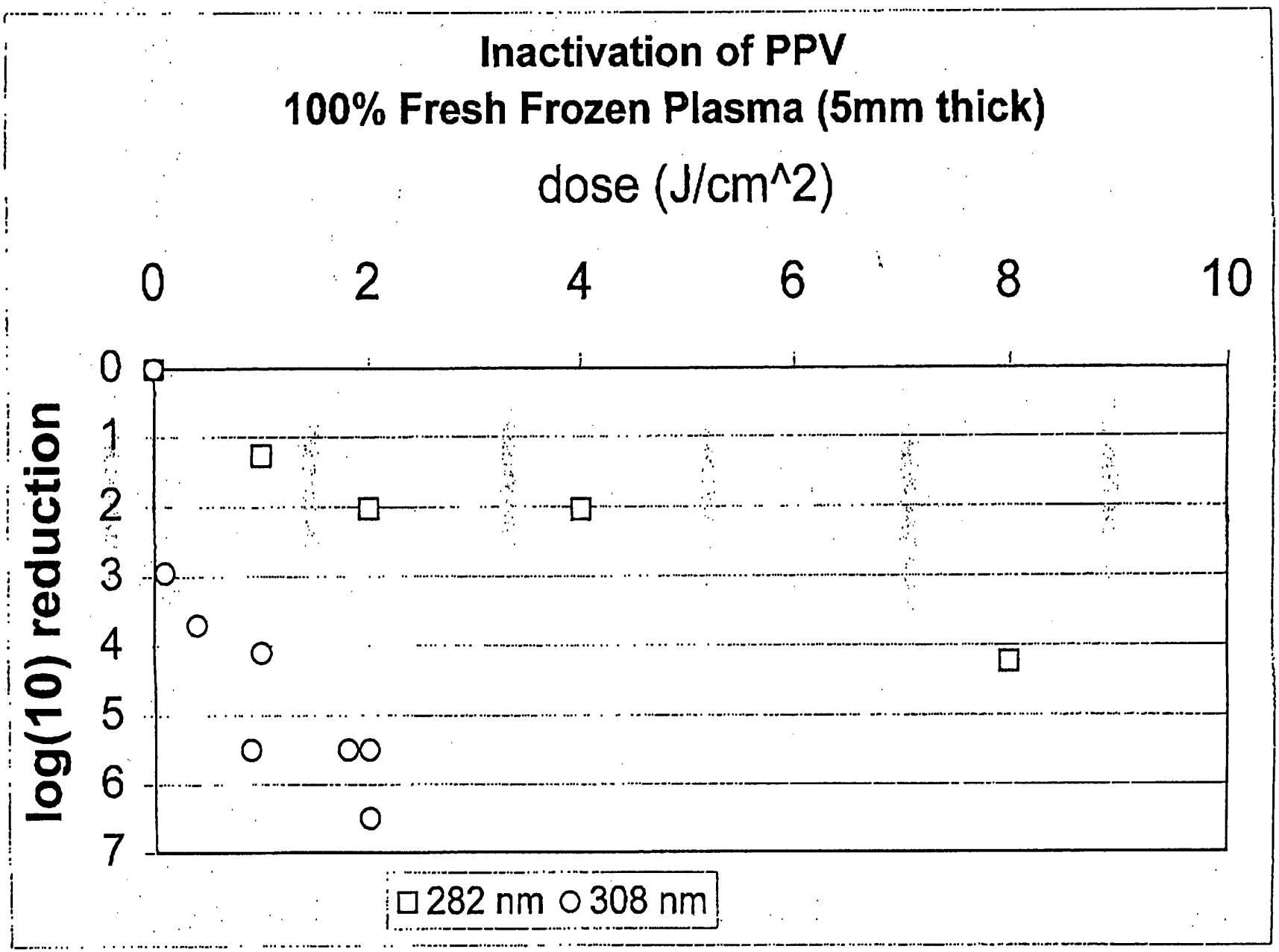

Inactivation of PPV
100% Fresh Frozen Plasma (5mm thick)
dose (J/cm^2)
0
2
4
6
8
10
log(10) reduction
0
1
2
3
4
5
6
7
282 nm
308 nm

FIG. 12a

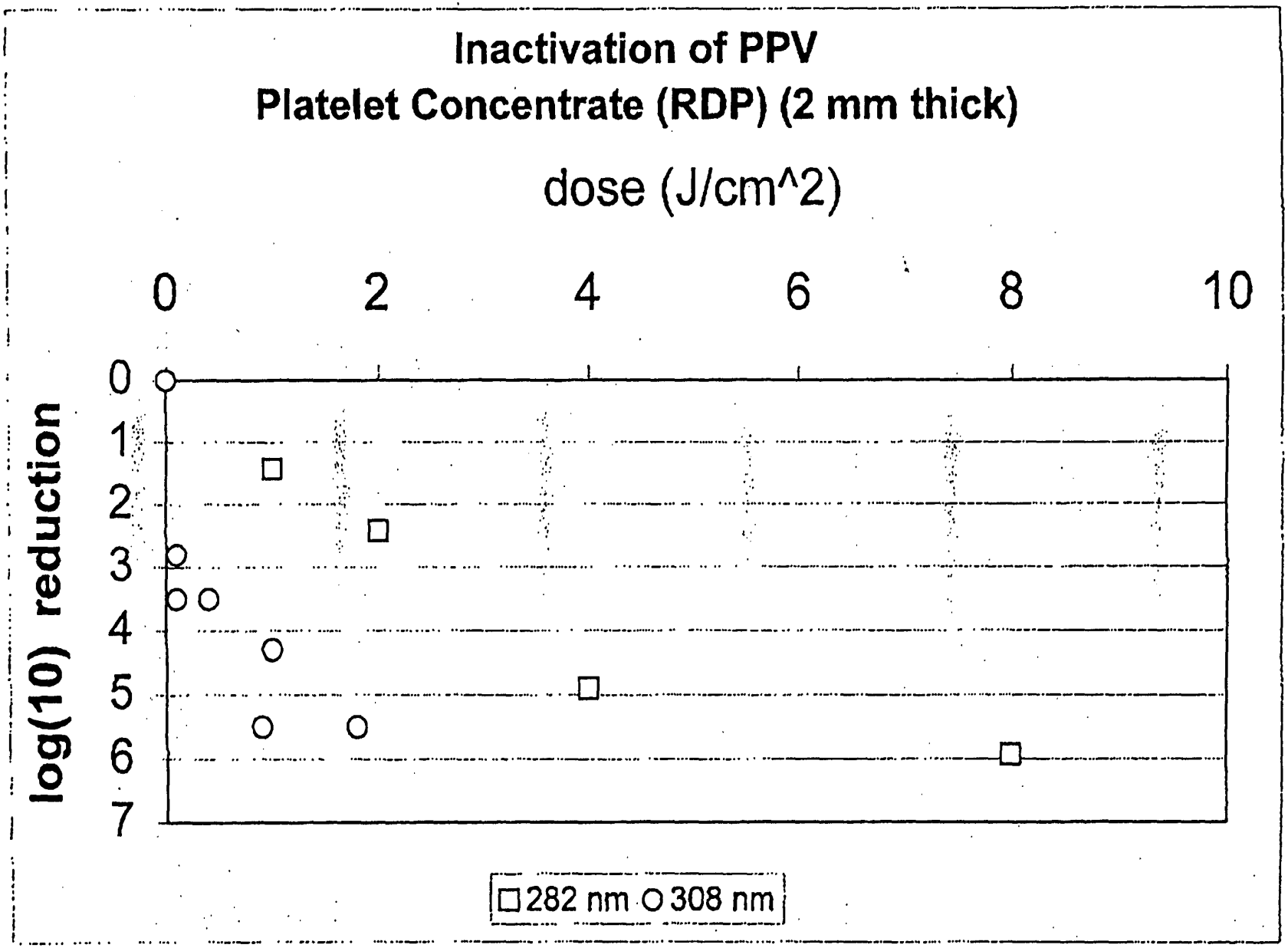

Inactivation of PPV
Platelet Concentrate (RDP) (2 mm thick)
dose (J/cm^2)
0
2
4
6
8
10
log(10) reduction
0
1
2
3
4
5
6
7
282 nm
308 nm

FIG. 12b

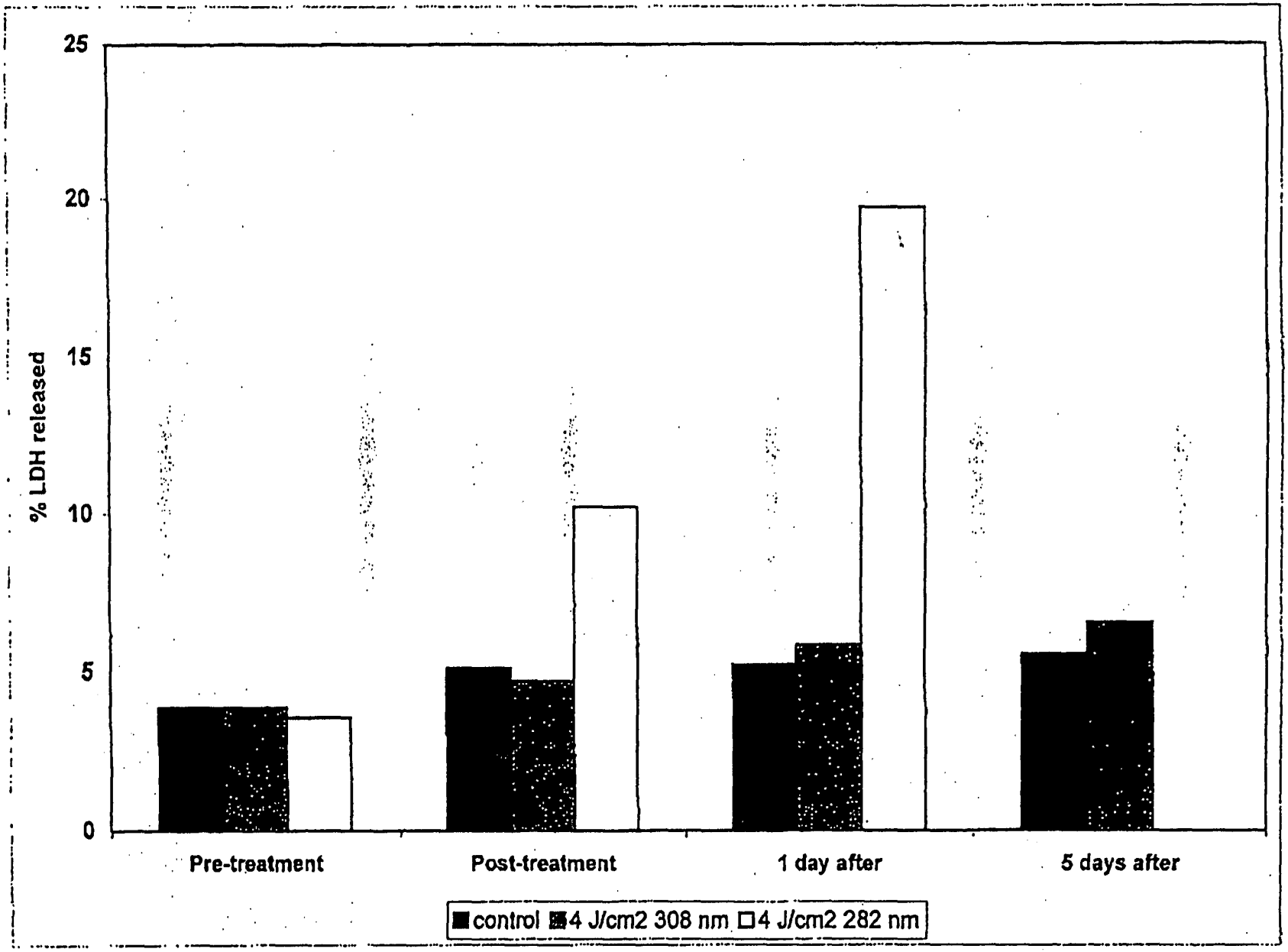

25
20
15
10
5
0
% LDH released
Pre-treatment
Post-treatment
1 day after
5 days after
control
4 J/cm2 308 nm
4 J/cm2 282 nm

FIG. 13